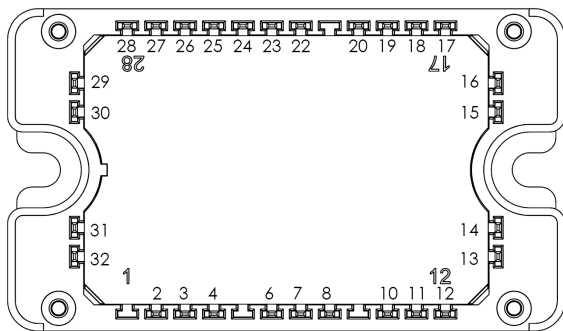
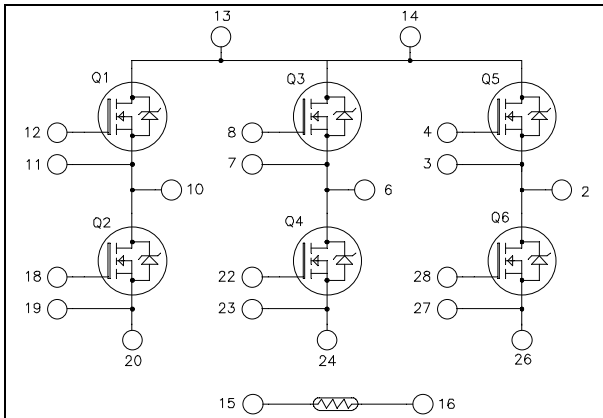


3 Phase bridge SiC MOSFET Power Module

$V_{DSS} = 700V$
 $R_{DS(on)} = 60m\Omega \text{ Max @ } T_j = 25^\circ C$
 $I_D = 61A \text{ @ } T_c = 25^\circ C$



Pins 20, 24 & 26 must be shorted together to perform a 3 phase bridge.

Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- **SiC Power MOSFET**
 - High speed switching
 - Low $R_{DS(on)}$
 - Ultra low loss
- Very low stray inductance
- Kelvin source for easy drive
- Internal thermistor for temperature monitoring
- AlN substrate for improved thermal performance


Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

Absolute maximum ratings (per SiC MOSFET)

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	700	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	61
		$T_c = 80^\circ C$	49
I_{DM}	Pulsed Drain current	122	A
V_{GS}	Gate - Source Voltage	-10/25V	V
$R_{DS(on)}$	Drain - Source ON Resistance	60	m Ω
P_D	Power Dissipation	$T_c = 25^\circ C$	240
			W


CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.
 See application note APT0502 on www.microsemi.com

Electrical Characteristics (per SiC MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} = 0V, V _{DS} = 700V			100	μA
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 20V I _D = 40A		53 56	60	mΩ
						T _j = 25°C T _j = 175°C
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} ; I _D = 1mA	1.7	2.5		V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = 20 V, V _{DS} = 0V			100	μA

Dynamic Characteristics (per SiC MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		1950		nF
C _{oss}	Output Capacitance	V _{DS} = 700V		230		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		50		
Q _g	Total gate Charge	V _{GS} = 0/+20V		125		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 466V		21		
Q _{gd}	Gate – Drain Charge	I _D = 40A		35		
T _{d(on)}	Turn-on Delay Time	V _{GS} = -5/+20V		10		ns
T _r	Rise Time	V _{Bus} = 466V		11		
T _{d(off)}	Turn-off Delay Time	I _D = 40A ; T _j = 150°C		40		
T _f	Fall Time	R _{Gext} = 5Ω		25		
E _{on}	Turn on Energy	Inductive Switching V _{GS} = -5/+20V V _{Bus} = 466V		570		μJ
E _{off}	Turn off Energy	I _D = 40A R _{Gext} = 5Ω		335		
R _{Gint}	Internal gate resistance			1.12		Ω
R _{thJC}	Junction to Case Thermal Resistance				0.63	°C/W

Body diode ratings and characteristics (per SiC MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _{SD} = 40A		4.25		V
t _{rr}	Reverse Recovery Time	I _{SD} = 40A ; V _{GS} = 0V V _R = 466V ; di _F /dt = 1000A/μs		45		ns
Q _{rr}	Reverse Recovery Charge			250		nC
I _{rr}	Reverse Recovery Current			10		A

Temperature sensor NTC (see application note APT0406 on www.microsemi.com).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B			4		%
					T _C = 100°C

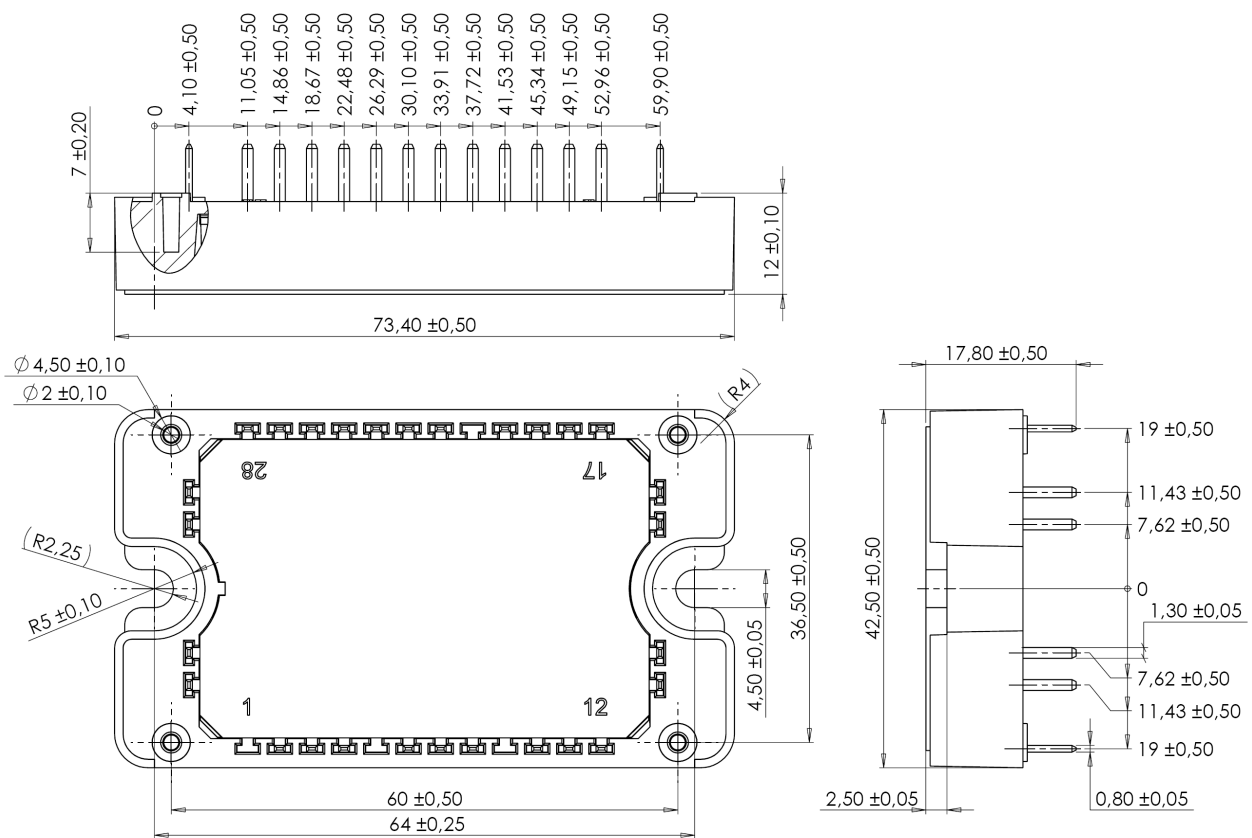
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

Symbol	Characteristic	Min	Max	Unit		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	175	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	100			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

Package outline (dimensions in mm)



See application note 1906 - Mounting Instructions for SP3F Power Modules on www.microsemi.com

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